

### Claims

- 5 1. A multilayer thermoplastic film, comprising:  
at least one polyolefin core layer having a first side and a second side,  
at least one abrasion resistant first thermoplastic skin layer overlying the  
first side of the core layer, and  
at least one second thermoplastic skin layer overlying the second side of  
the core layer; wherein the composition of the core layer being different than the  
composition of the skin layers, and the core layer and the skin layers being  
characterized by the absence of PVC.
- 10 2. The film of claim 1 further comprising an intermediate layer  
positioned between the core layer and the second thermoplastic skin layer, the  
supplemental core layer being characterized by the absence of PVC.
- 15 3. The film of claim 1 further comprising a clear topcoat layer which  
overlies the first thermoplastic skin layer, wherein the clear topcoat layer is  
characterized by the absence of PVC.
4. The film of claim 1 wherein at least one layer of a pressure  
sensitive adhesive overlies the second thermoplastic skin layer.
5. The film of claim 4 wherein a release liner overlies the layer of  
pressure sensitive adhesive.
- 20 6. The film of claim 1 wherein the first skin layer is clear.
7. The film of claim 1 wherein the second skin layer is clear.
8. The film of claim 1 wherein the core layer further comprises at least  
one second polymeric material selected from ethylene-unsaturated carboxylic  
acid copolymers, ethylene-methacrylic acid copolymers, ionomers derived from  
25 sodium, lithium or zinc and an ethylene/unsaturated carboxylic acid copolymer,  
and combinations thereof.
9. The film of claim 1 wherein the second thermoplastic material being  
present at a concentration of about 2% to about 25% by weight based on the  
weight of the core layer.
- 30 10. The film of claim 1 wherein the core comprises a light stabilizer at a  
concentration of about 1,000 to about 10,000 ppm based on the weight of the of  
core layer.

11. The film of claim 1 wherein the first skin layer is comprised of an ionomer derived from sodium, lithium or zinc and an ethylene/unsaturated carboxylic acid copolymer.

12. The film of claim 1 wherein the core layer is pigmented.

5 13. The film of claim 1 wherein the core layer is clear.

14. The film of claim 1 wherein the overall thickness of the multilayered thermoplastic film is from about 1 to about 10 mils and the thickness of the core layer being from about 10% to about 90% of the overall thickness.

10 15. The film of claim 1 wherein the core layer further comprises an adhesive material.

16. The film of claim 1 wherein at least one of the skin layers further comprises an adhesive material, antiblock agent, slip additive, or combination of two or more thereof.

15 17. The film of claim 4 wherein the pressure sensitive adhesive layer comprises a rubber based adhesive, acrylic adhesive, vinyl ether adhesive, silicone adhesive or combination of two or more thereof.

18. The film of claim 5 wherein the release liner is comprised of a release coating composition overlying a backing liner, the backing liner being comprised of paper, polymeric film or a combination thereof.

20 19. The film of claim 5 wherein the release liner is comprised of a release coating composition overlying a backing liner, the release coating composition being a silicone release coating composition.

25 20. The film of claim 5 wherein the release liner is comprised of a release coating composition overlying a backing liner, the release coating composition comprising a polyorganosiloxane.

21. A multilayered thermoplastic film, comprising:

30 a thermoplastic core layer having a first side and a second side, the core layer comprising: (a) a polyolefin having a density in the range of about 0.89 to about 0.97 grams per cubic centimeter; (b) a second polymeric material selected from ethylene-acrylic acid copolymers, ethylene-methacrylic acid copolymers, ionomers derived from sodium, lithium or zinc and an ethylene/methacrylic acid copolymer, and combinations thereof, wherein the second thermoplastic material being present at a concentration of about 2% to about 25% by weight based on

the weight of the core layer; and (c) a light stabilizer at a concentration of about 1,000 to about 10,000 ppm based on the weight of the of core layer;

an abrasion and scuff resistant clear first thermoplastic skin layer overlying the first side of the core layer, the first skin layer comprising a light stabilizer at a concentration of about 2,000 to about 20,000 ppm based on the weight of the first skin layer; and

a clear second thermoplastic skin layer overlying the second side of the core layer; the second skin layer comprising a light stabilizer at a concentration of about 1,000 to about 15,000 ppm based on the weight of the second skin layer;

the composition of the core layer being different than the composition of the skin layers, the core layer and the skin layers being characterized by the absence of PVC.

22. The film of claim 21 wherein a intermediate layer is positioned between the core layer and the second thermoplastic skin layer, the intermediate layer being characterized by the absence of PVC.

23. The film of claim 21 wherein a clear topcoat layer overlies the first thermoplastic skin layer, the clear topcoat layer being characterized by the absence of PVC.

24. The film of claim 21 wherein a layer of a pressure sensitive adhesive overlies the second thermoplastic skin layer.

25. The film of claim 24 wherein a release liner overlies the layer of pressure sensitive adhesive.

26. The film of claim 21 wherein each of the skin layers have the same composition.

27. The film of claim 21 wherein the skin layers have different compositions.

28. The film of claim 21 wherein the core layer and the skin layers comprise a coextrudate.

29. The film of claim 21 wherein the first skin layer is comprised of an ionomer derived from sodium, lithium or zinc and an ethylene/methacrylic acid copolymer.

30. The film of claim 21 wherein the core layer is pigmented.

31. The film of claim 21 wherein the core layer is clear.

32. The film of claim 21 wherein the overall thickness of the multilayered thermoplastic film is from about 1 to about 10 mils, the thickness of the core layer being from about 10% to about 90% of the overall thickness.

33. The film of claim 21 wherein the core layer further comprises an  
5 adhesive material.

34. The film of claim 21 wherein at least one of the skin layers further comprises an adhesive material, antiblock agent, slip additive, or combination of two or more thereof.

35. The film of claim 24 wherein the pressure sensitive adhesive layer  
10 comprises a rubber based adhesive, acrylic adhesive, vinyl ether adhesive, silicone adhesive or combination of two or more thereof.

36. The film of claim 25 wherein the release liner is comprised of a release coating composition overlying a backing liner, the backing liner being comprised of paper, polymeric film or a combination thereof.

37. The film of claim 25 wherein the release liner is comprised of a  
15 release coating composition overlying a backing liner, the release coating composition being a silicone release coating composition.

38. The film of claim 25 wherein the release liner is comprised of a release coating composition overlying a backing liner, the release coating  
20 composition comprising a polyorganosiloxane.

39. A sign cutting method, comprising:

providing a pressure sensitive adhesive composite, the composite comprising a multilayered thermoplastic film, a layer of a pressure sensitive adhesive and a release liner;

25 the multilayered thermoplastic film comprising (1) a thermoplastic core layer having a first side and a second side, (2) an abrasion and scuff resistant clear first thermoplastic skin layer overlying the first side of the core layer, and (3) a clear second thermoplastic skin layer overlying the second side of the core layer, (4) the pressure sensitive adhesive layer being positioned between the  
30 second thermoplastic skin layer and the release liner, the adhesive layer being preferentially adherent to the second thermoplastic skin layer;

the thermoplastic core layer comprising: (a) a polyolefin having a density in the range of about 0.89 to about 0.97 grams per cubic centimeter; (b) a second polymeric material selected from the group consisting of a ethylene -acrylic acid

copolymers, ethylene-methacrylic acid copolymers, ionomers derived from sodium, lithium or zinc and an ethylene/methacrylic acid copolymer, or combination of two or more thereof, the second thermoplastic polymeric material being present at a concentration of about 2% to about 25% by weight based on the weight of the core layer; and (c) a light stabilizer at a concentration of about 1,000 to about 10,000 ppm based on the weight of the core layer;

the first thermoplastic skin layer comprising a light stabilizer at a concentration of about 2,000 to about 20,000 ppm based on the weight of the first skin layer;

the second thermoplastic skin layer comprising a light stabilizer at a concentration of about 1,000 to about 15,000 ppm based on the weight of the second skin layer;

the composition of the core layer and the skin layers being different, and the core layer and the skin layers being characterized by the absence of PVC;

cutting an image in the multilayered thermoplastic film; and transferring the image to a substrate.

40. A sign cutting method, comprising:

(A) providing a pressure sensitive adhesive composite, the composite comprising a multilayered thermoplastic film, a layer of a pressure sensitive adhesive, and a release liner;

the multilayered thermoplastic film comprising (1) a thermoplastic core layer having a first side and a second side, (2) an abrasion and scuff resistant clear first thermoplastic skin layer overlying the first side of the core layer, and (3) a clear second thermoplastic skin layer overlying the second side of the core layer, (4) the pressure sensitive adhesive layer being positioned between the second thermoplastic skin layer and (5) the release liner, the adhesive layer being preferentially adherent to the second thermoplastic skin layer;

the thermoplastic core layer comprising: (a) a polyolefin having a density in the range of about 0.89 to about 0.97 grams per cubic centimeter; (b) a second polymeric material selected from the group consisting of ethylene-acrylic acid copolymers, ethylene-methacrylic acid copolymers, ionomers derived from sodium, lithium or zinc and an ethylene/methacrylic acid copolymer, or combination of two or more thereof, the second thermoplastic polymeric material being present at a concentration of about 2% to about 25% by weight based on

the weight of the core layer; and (c) a light stabilizer at a concentration of about 1,000 to about 10,000 ppm based on the weight of the core layer;

the first thermoplastic skin layer comprising a light stabilizer at a concentration of about 2,000 to about 20,000 ppm based on the weight of the first skin layer;

the second thermoplastic skin layer comprising a light stabilizer at a concentration of about 1,000 to about 15,000 ppm based on the weight of the second skin layer;

the composition of the core layer being different from the composition of the skin layers, and the core layer and the skin layers being characterized by the absence of PVC;

(B) cutting the multilayered thermoplastic film in the form of an image to provide needed portions of the multilayered film and unneeded portions of the multilayered film;

(C) removing the unneeded portions of the multilayered film from the composite;

(D) placing a pressure sensitive adhesive mask over the composite in contact with the needed portions with sufficient pressure to adhere the needed portions to the mask, the mask being in contact with the first thermoplastic skin layer of the needed portions;

(E) separating the mask and the needed portions from the composite, the separated needed portions having the pressure sensitive adhesive adhered to the second thermoplastic skin layer of the needed portions;

(F) placing the mask and the needed portions against the substrate to which the image is to be adhered, the pressure sensitive adhesive adhered to the second thermoplastic skin layer of the needed portions being in contact with the substrate; and

(G) removing the mask from the needed portions leaving the needed portions adhered to the substrate.

41. An electronic cutting film, comprising:

(a) a core layer comprising polyolefin and having opposing major surfaces;

(b) an abrasion resistant layer disposed on one major surface; and

surface. (c) an adhesive priming layer disposed on an opposing major

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